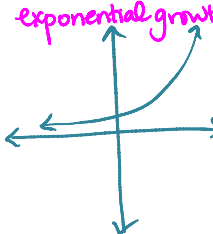
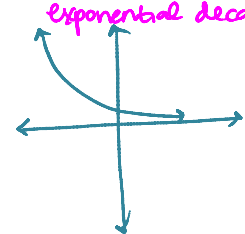
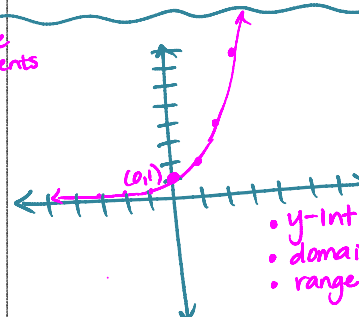
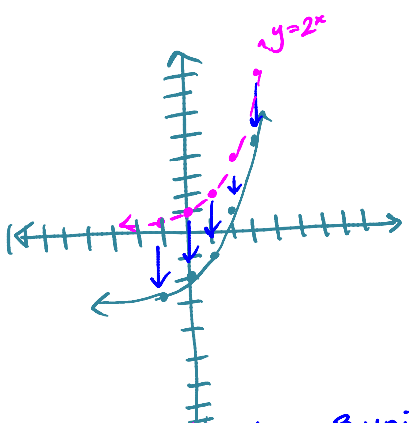
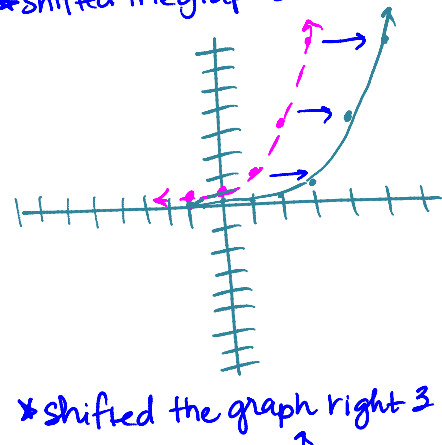


# EXPONENTIAL FUNCTIONS

EQUATION	Table	GRAPH																		
$y = a \cdot b^x$ initial value $a$ constant multiplier $b$ $a \neq 0$ and $b \neq 1$	<table border="1"> <thead> <tr> <th>x</th> <th><math>y = a \cdot b^x</math></th> </tr> </thead> <tbody> <tr><td>-1</td><td></td></tr> <tr><td>0</td><td></td></tr> <tr><td>1</td><td></td></tr> <tr><td>2</td><td></td></tr> <tr><td>3</td><td></td></tr> </tbody> </table> * Be careful... Remember order of ops (PEMDAS)	x	$y = a \cdot b^x$	-1		0		1		2		3		exponential growth  exponential decay 						
x	$y = a \cdot b^x$																			
-1																				
0																				
1																				
2																				
3																				
① # of folds: $y = 1 \cdot 2^x$ one layer $\rightarrow$ layers double w/ every fold. exponential growth (when $a > 1$ )	<table border="1"> <thead> <tr> <th>x</th> <th><math>y = 2^x</math></th> <th>Successive Quotients</th> </tr> </thead> <tbody> <tr><td>-1</td><td><math>2^{-1} = 1/2</math></td><td><math>1/2 = 2</math></td></tr> <tr><td>0</td><td><math>2^0 = 1</math></td><td><math>1 = 2</math></td></tr> <tr><td>1</td><td><math>2^1 = 2</math></td><td><math>2 = 2</math></td></tr> <tr><td>2</td><td><math>2^2 = 4</math></td><td><math>4 = 2</math></td></tr> <tr><td>3</td><td><math>2^3 = 8</math></td><td><math>8 = 2</math></td></tr> </tbody> </table>	x	$y = 2^x$	Successive Quotients	-1	$2^{-1} = 1/2$	$1/2 = 2$	0	$2^0 = 1$	$1 = 2$	1	$2^1 = 2$	$2 = 2$	2	$2^2 = 4$	$4 = 2$	3	$2^3 = 8$	$8 = 2$	 <ul style="list-style-type: none"> <li>y-int (0, a)</li> <li>domain <math>(-\infty, \infty)</math></li> <li>range: <math>(-\infty, 0)</math> or <math>(0, \infty)</math> but not both</li> </ul>
x	$y = 2^x$	Successive Quotients																		
-1	$2^{-1} = 1/2$	$1/2 = 2$																		
0	$2^0 = 1$	$1 = 2$																		
1	$2^1 = 2$	$2 = 2$																		
2	$2^2 = 4$	$4 = 2$																		
3	$2^3 = 8$	$8 = 2$																		

What happens when the equation is modified from  $y = a \cdot b^x$  to  $y = a \cdot b^{x-h} + k$ ?!?

	"Parent Function"	Transformation																									
② $y = 2^x - 3$	<table border="1"> <thead> <tr> <th>x</th> <th><math>y = 2^x</math></th> </tr> </thead> <tbody> <tr><td>-1</td><td>1/2</td></tr> <tr><td>0</td><td>1</td></tr> <tr><td>1</td><td>2</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>8</td></tr> </tbody> </table>	x	$y = 2^x$	-1	1/2	0	1	1	2	2	4	3	8	<table border="1"> <thead> <tr> <th>x</th> <th><math>y = 2^x - 3</math></th> </tr> </thead> <tbody> <tr><td>-1</td><td>-2.5</td></tr> <tr><td>0</td><td>-2</td></tr> <tr><td>1</td><td>-1</td></tr> <tr><td>2</td><td>1</td></tr> <tr><td>3</td><td>5</td></tr> </tbody> </table> y-int $\rightarrow$ 0 Subtracted 3 from each y-value	x	$y = 2^x - 3$	-1	-2.5	0	-2	1	-1	2	1	3	5	 * shifted the graph down 3 units *
x	$y = 2^x$																										
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③ $y = 2^{x-3}$ right 3 units up 0	<table border="1"> <thead> <tr> <th>x</th> <th>f(x)</th> </tr> </thead> <tbody> <tr><td>2</td><td>1/2</td></tr> <tr><td>3</td><td>1</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>4</td></tr> <tr><td>3</td><td>8</td></tr> <tr><td>4</td><td></td></tr> </tbody> </table>	x	f(x)	2	1/2	3	1	4	2	5	4	3	8	4			 * shifted the graph right 3 units *										
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2	1/2																										
3	1																										
4	2																										
5	4																										
3	8																										
4																											

$$\textcircled{4} y = 2^{x+2} + 4$$

\* Left 2 units  
Up 4 units

$$\textcircled{5} y = 3^{x-5} - 2$$

3		8
4		
5		
x		f(x)
-3	1	$\frac{1}{2} 4.5$
-2	0	1 5
-1	1	2 6
0	2	4 8
1	3	8 12

\* shifted the graph right 3 units \*

